Section 6.6 ALTITUDE CORRECTION FACTORS

This section details the altitude correction factors (ACF) used in EMFAC2000.

6.6.1 Introduction

The basic exhaust emission rates are based on FTP or UC tests performed at CARB's Haagen-Smit Laboratory (HSL). The HSL is at an altitude of 300 feet. Emission rates developed from testing at HSL are representative of emissions from vehicles operating at sea level. These emission rates are then assigned to all vehicles operating in California. However, some older technology vehicles emit more hydrocarbon (HC) and carbon monoxide (CO) emissions and have lower oxides of nitrogen (NOx) emissions when operated at high altitudes. This is especially a concern for older technology vehicles operating in the Lake Tahoe Air Basin, which is at an altitude of more than 5,000 feet. At higher altitudes the air pressure and air density is lower than that at sea level. Older technology vehicles, designed for operation at sea level, were not equipped with adaptive fuel controls to reduce the fuel flow for operation at high altitudes. Hence older technology vehicles tended to run rich at higher altitudes. This increased HC and CO emissions but suppressed NOx formation due to the quenching effect of the excess fuel.

6.6.2 Methodology

In MVEI7G, altitude correction factors of 1.3 (HC), 1.9 (CO) and 0.6 (NOx) were applied to the running exhaust and continuous starting emissions in the Lake Tahoe Air Basin. These factors were applied to all vehicle classes including diesel-fueled vehicles. The ACF have remained the same since EMFAC7D. In EMFAC2000, the ACF were revisited with the intentions of updating them, and verifying the magnitude of emissions increase. Staff contacted USEPA to obtain any new or old test data, which were used in developing the ACF. The historical data are no longer available; however, both CARB and USEPA staff recollect that the ACF are only applicable to older technology gasoline fueled vehicles. Newer technology vehicles have adaptive fuel controls that compensate for higher altitudes. In EMFAC2000, the ACF are only applied to the following technology groups (Table 6.6-1) operating in the Lake Tahoe Air Basin.

Table 6.6-1 Technology Groups With ACF

Tech Group	Model Years	Technology Group Descriptions
1	Pre-1975	With Secondary Air
2	Pre-1975	Without Secondary Air
3	1975 & Later	No Catalyst
4	1975-1976	Oxidation catalyst with secondary air
5	1975-1979	Oxidation catalyst without secondary air
6	1980 & Later	Oxidation catalyst without secondary air
7	1977 & Later	Oxidation catalyst with secondary air